What is Claimed is:

1.   An image processing device for applying a certain process to gradation data of a plurality of color components for each pixel of an input image data comprising:

unwanted pixel determining means for determining as to whether all the gradation data of the plurality of color components composing each one of the pixels of the input image data satisfy a unwanted gradation condition that is predetermined with respect to each one of the color components, the judgement being made pixel by pixel; and

unwanted pixel gradation conversion means for converting the gradation data of the plurality of color components of the pixel that has been judged to satisfy the unwanted gradation condition by the unwanted pixel determining means into a predetermined gradation which is set with respect to each one of the color components.

2.   The image processing device according to claim 1, further comprising a unwanted gradation condition setting means for determining a gradation condition of an unnecessary image data in the input image data to set the gradation condition as the unwanted gradation condition.

3.   The image processing device according to claim 2, wherein the unnecessary image data includes an undertone portion in the

input image data.

4.   The image processing device according to claim 2, wherein the unnecessary image data includes an undertone portion and a backside image portion in the input image data.

5.   The image processing device according to claim 2, wherein the unnecessary image data includes a backside image portion in the input image data.

6.   The image processing device according to claim 2, wherein the unwanted gradation condition setter means includes an unnecessary image data gradation detecting means for detecting a gradation range of the unnecessary image data with respect to each one of the color components based on the gradation data of the input image data to set the unwanted gradation condition.

7.   The image processing device according to claim 6, wherein the unnecessary image data gradation detecting means detects a specific gradation that satisfies a predetermined detection condition with respect to each one of the color components based on the gradation data of the input image data to determine the gradation range of the unnecessary image data based on the detected gradation, the detection being carried out by checking a frequency of the gradation from a lower gradation side in a

histogram showing the frequency, number of pixels, vs. gradation with respect to each color component of the input image data.

8.   The image processing device according to claim 7, wherein the unnecessary image data gradation detecting means includes a smoothing processing means for smoothing a curve in the histogram.

9.   The image processing device according to claim 7, wherein the detection condition is either (I) or (II):

(I) under this condition, the specific gradation is given a gradation value at which slope of a curve in the histogram shifts from negative to positive;

(II) under this condition, the specific gradation is given a gradation value at which a change rate of a slope of a curve in the histogram shifts from negative to positive.

10.   The image processing device according to claim 7, wherein the detection condition is either (I), (II), or (III):

(I) under this condition, the specific gradation is given a gradation value at which a slope of a curve in the histogram shifts from negative to positive;

(II) under this condition, the specific gradation is given a gradation value at which a change rate of a slope of a curve in the histogram shifts from negative to positive;

(III) under this condition, the specific gradation is given a gradation value at which an slope of a curve in the histogram is negative, and a ratio of the frequency of the gradation value to a sum of the frequencies of the gradations lower than the gradation value is or smaller than a predetermined value.

11. The image processing device according to claim 9, wherein the unnecessary image data gradation detecting means sets a lowest gradation having a frequency exceeding a predetermined frequency as a detection start gradation and starts detection from the detection start gradation toward a higher gradation.

12. The image processing device according to claim 7, wherein the unnecessary image data gradation detecting means sets a lowest gradation having a frequency exceeding a predetermined frequency as a detection start gradation and judges whether a first detected gradation satisfies one of the conditions (I), (II), (III), and (IV) when searching for a target gradation from the detection start gradation toward a higher gradation:

(I) under this condition, the target gradation is given a gradation value at which an slope of a curve in the histogram shifts from negative to positive;

(II) under this condition, the target gradation is given a gradation value at which a change rate of a slope of a curve in the histogram shifts from negative to positive;

(III) under this condition, the target gradation is given a gradation value at which a slope of a curve in the histogram is negative, and a ratio of the frequency of the gradation value to a sum of the frequencies of the gradations lower than the gradation value is or smaller than a predetermined value;

(IV) under this condition, the target gradation is given a gradation value at which a distance from the detection start gradation value toward a higher gradation value is equal to or greater than a predetermined value.

13. The image processing device according to claim 7, wherein the unnecessary image data gradation detecting means sets a gradation range having an uppermost gradation lower than a first detected gradation as the gradation range of the unnecessary image data when searching for the target gradation from a lower gradation side in the histogram.

14. The image processing device according to claim 7, wherein the unnecessary image data gradation detecting means sets a gradation range having an uppermost gradation lower than a second detected gradation as the gradation range of the unnecessary image data when searching for the target gradation from a lower gradation side in the histogram.

15. The image processing device according to claim 7, wherein

the unnecessary image data gradation detecting means selectively sets a gradation range having an uppermost gradation lower than a first detected gradation or a gradation range having an uppermost gradation lower than a second detected gradation as the gradation range of the unnecessary image data when searching for the target gradation from a lower gradation side in the histogram.

16.   The image processing device according to claim 7, wherein the unnecessary image data gradation detecting means selectively sets a gradation range having an uppermost gradation lower than a first detected gradation or a gradation range having an uppermost gradation lower than a second detected gradation as the gradation range of the unnecessary image data when searching for the target gradation from a lower gradation side in the histogram in response to an input by an operator.

17.   The image processing device according to claim 1, wherein the predetermined gradation is a lowest gradation outputtable by an image forming apparatus adapted to be electrically connected thereto.

18.   The image processing device according to claim 6, wherein the unwanted gradation condition setter means controls the unnecessary image data gradation detecting means to detect a

unwanted gradation threshold value based on an upper limit of the gradation range of the unnecessary image data so as to set the unwanted gradation condition such that the unwanted gradation is a gradation lower than the unwanted gradation threshold value.

19. The image processing device according to claim 7, wherein the unnecessary image data gradation detecting means sets a gradation range having a lowermost gradation higher than a first detected gradation and an uppermost gradation lower than a second detected gradation as the gradation range of the unnecessary image data when searching for the target gradation from a lower gradation side in the histogram.

20. The image processing device according to claim 19, wherein the predetermined gradation includes a gradation of the data concerning an undertone in the input image data.

21. The image processing device according to claim 20, wherein the gradation of the data concerning the undertone is computed based on the first detected gradation when searching for the target gradation from a lower gradation side in the histogram.

22. The image processing device according to claim 18, further comprising:

an adjusting pixel determining means for judging whether

a pixel having gradation data that does not satisfy the unwanted gradation condition with respect to at least one of the color components is an adjusting pixel that satisfies a certain adjusting gradation condition which is predetermined with respect to each one of the color components, the judgement being made with respect to all the gradation data of the plurality of color components composing the pixel; and

an adjusting pixel gradation conversion means for converting each one of the gradation data of the plurality of color components composing the adjusting pixel into a gradation lower than the gradation of the adjusting pixel in the input image data.

23. The image processing device according to claim 22, wherein the adjusting gradation condition sets the gradation lower than a predetermined adjusting gradation threshold value.

24. The image processing device according to claim 23, wherein the adjusting gradation threshold value is determined based on the unwanted gradation threshold value.

25. The image processing device according to claim 23, wherein the adjusting pixel gradation conversion means converts gradation data of each one of the color components of each one of the adjusting pixels into a gradation that is computed in

accordance with the gradation in the input image data, based on a function of the unwanted gradation threshold value and the adjusting gradation threshold value as parameters with respect to each one of the color components.

26. The image processing device according to claim 23, wherein the adjusting pixel gradation conversion means sets a predetermined common gradation lowering rate with respect to each one of the adjusting pixels to convert gradation data of all the color components composing the adjusting pixel into a gradation that is lowered at a gradation lowering rate generally the same as the common gradation lowering rate with respect to the gradation of each one of the color components in the input image data.

27. The image processing device according to claim 26, further comprising:

a target color component setter means for setting one of the plurality of color components composing each one of the pixels of the input image data as a target color component, wherein

the adjusting pixel gradation conversion means sets the common gradation lowering rate with respect to each one of the adjusting pixels depending on the gradation of the target color component in the input image data.

28.   The image processing device according to claim 27, wherein the target color component setter means sets a color component having a smallest distance relative to the adjusting pixel threshold value among the plurality of color components composing each one of the adjusting pixels as the target color component.

29.   The image processing device according to claim 27, wherein the adjusting pixel gradation conversion means computes the common gradation lowering rate with respect to each one of the adjusting pixels depending on the gradation of the target color component of each one of the adjusting pixels in the input image data, based on a function which is set by the unwanted gradation threshold value and the adjusting gradation threshold value of the target color component as parameters.